Bloom Energy in Israel

December, 2013

A Better Energy Solution

Bloomenergy

The Bloom Energy Server

Scalable and Modular

Fuel Cell
25 W

System
250 kW

Solution
250 kW to MWs

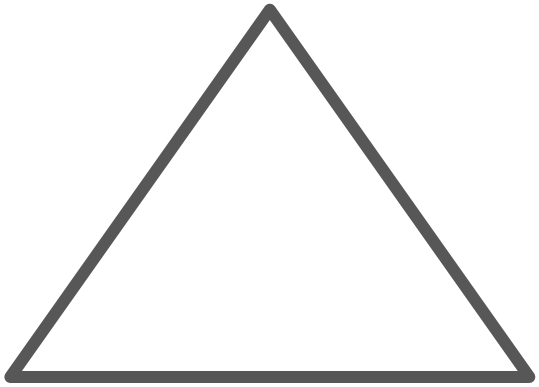
Runs on natural gas or biogas

Converts fuel to electricity
- Without combustion
- At 60%+ electrical efficiency

Outputs
- AC or DC power
- Low/No CO_2
- No NO_x or SO_x

Bloom Energy converts gas to delivered electricity more efficiently and more reliably than any other commercially available technology on earth

Value Proposition



Current Customer Sectors

- Telecom
- Hospitals
- Cold storage
- Data centers
- eCommerce
- Supermarkets
- Retail
- Biotech
- Utilities
- Sports arenas
- Office buildings
- Government facilities
- Banks
- Manufacturing
- Universities
- Food processing
- Bottling plants

Benefits of Bloom Platform

1. Modular Building Blocks
For Scalable Solutions

2. Reliable, Constant Electrical Output 24x7x365

3. Solid State & Redundant Design
Resilient to External Events

8. Fast Time to Power

The Bloom Energy Server

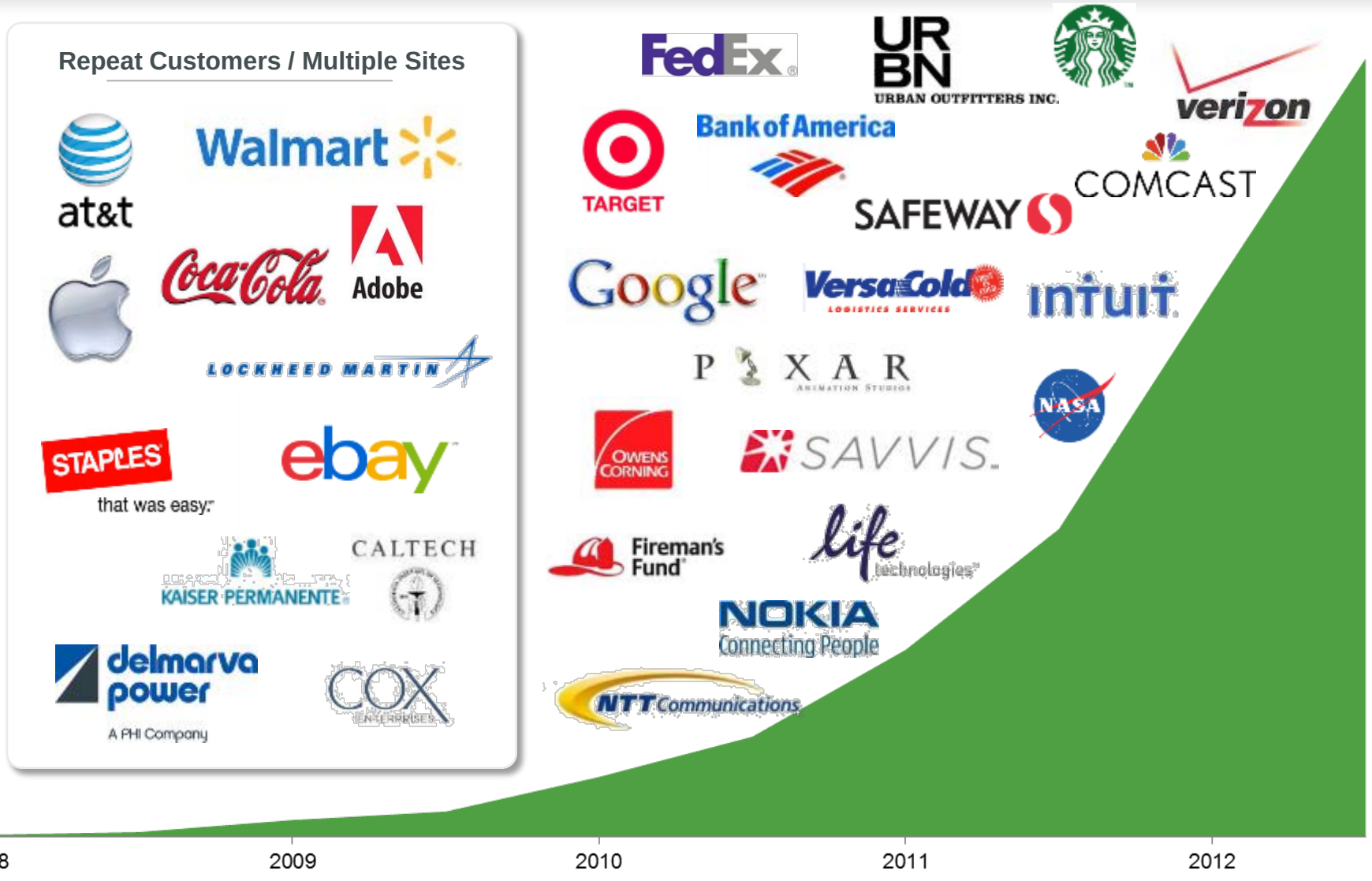
4. Reduced/Zero CO_2
No NOx/SOx

7. Energy Independence
Utilize Domestic Natural Gas

6. Affordable
Low Cost Materials
60% Electrical Efficiency

5. Low Resource Demands
Requires Virtually No Water

Bloom Today: Over 100 MW Installed



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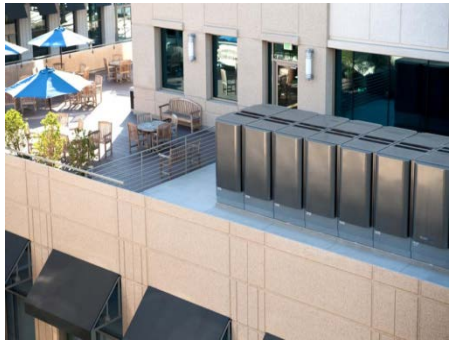
Bloom: Highly Scalable Streamlined Solutions

400 kW
Corporate Office



6 MW
Data Center

10 MW
Data Center

30 MW
Utility Deployment

Bloom Reliability Solution

Conventional Model

Electric Grid

+

Inactive Equipment

Backup Generator

UPS

Batteries

Sunk capital in equipment customers hope to never use

Bloom Model

Bloom Always On

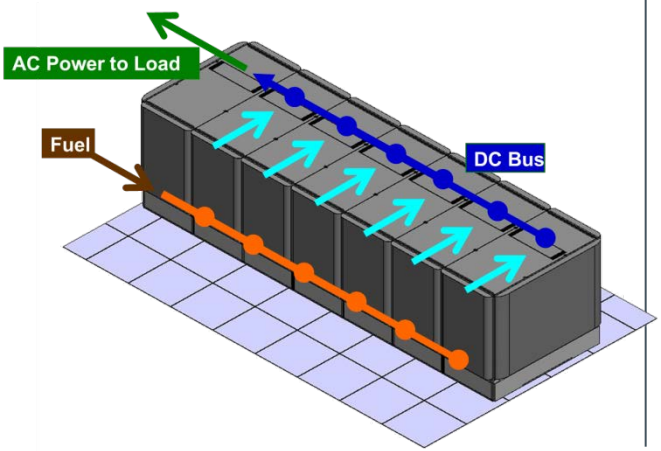
+

Electric Grid

Independent from gas grid

Mission Critical Reliability

Highly Available Generation

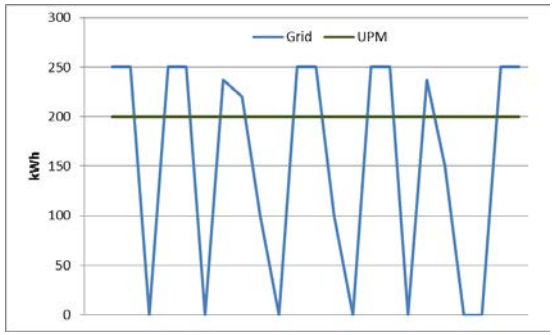


KEY DESIGN ELEMENTS

- Multiple levels of redundancy
- No single point of failure
- Concurrent maintainability
- Simple air-cooled design

Uninterruptible Power Modules

UPM Output During Grid Events

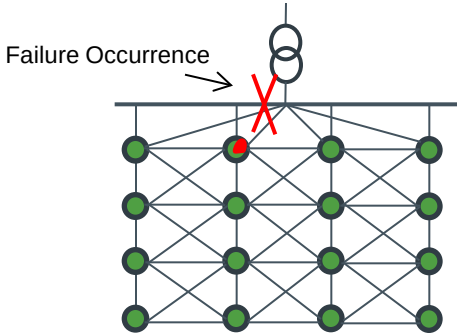


KEY DESIGN ELEMENTS

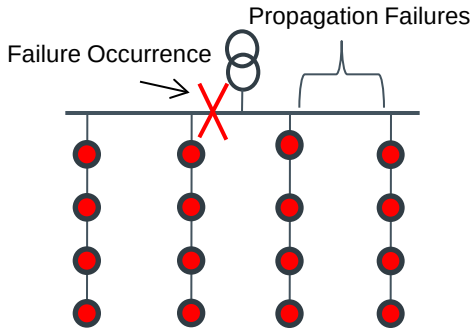
- Grid independent inverters
- Load following
- Energy storage
- Digital power quality

Reliable Fuel Delivery

Gas Pipelines



Electricity Grid



Hurricane Sandy:
Gas Grid > 100x More Reliable

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Bloom Energy Strategic Power – Datacenter

Analysis of Design Alternatives for Supplying Electric Power to Mission-Critical Loads in Data Centers: Reliability, Environmental, and Efficiency Aspects

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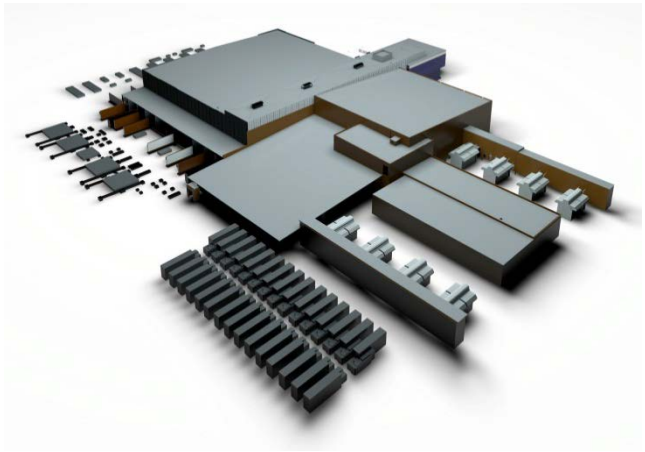
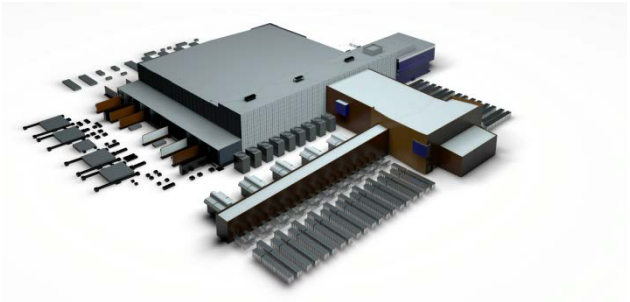
6 MWs of Bloom Energy Servers powering eBay data center

Traditional topology reliability 0.96

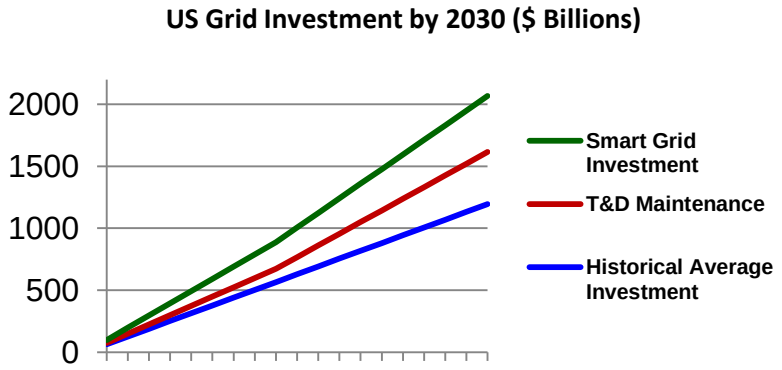


Bloom Energy topology 0.99996
"Dramatically outperforms"



Bloom Provides More Cost Predictability

Conventional Solution: Uncertain Cost Outlook



- Rising and unpredictable costs will directly impact electric rates
- Natural disasters + potential cyber attacks + highly intermittent renewables will make grid more unstable
- Outdated infrastructure, not upgraded, “run to fail” mode

Bloom Solution: Control and Predictability

Fixed equipment and maintenance costs over lifetime, (up to 20 years)

Natural Gas is domestic, abundant, modest cost outlook

Avoidance of power disruption costs due to superior reliability

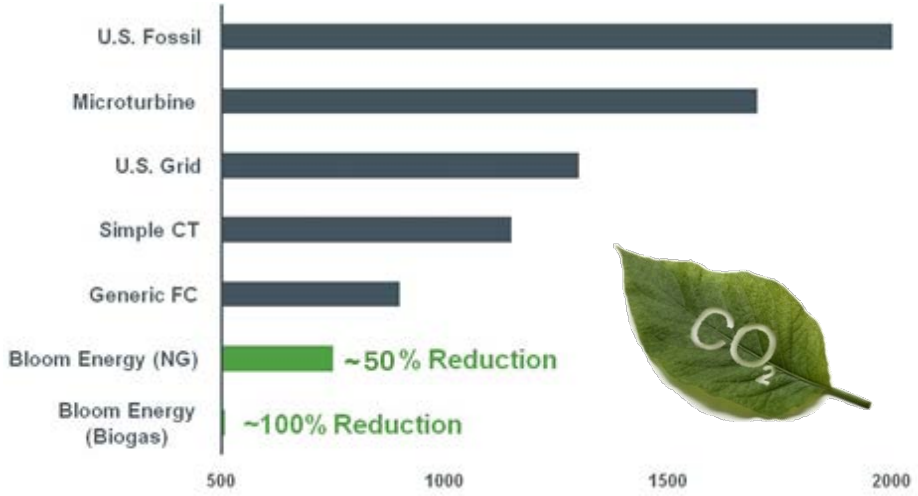
New Market Criteria: Israel

Criteria	Status	Details
Spark spread		Unclear what will happen with electricity and gas rates in Israel over next few years
Natural gas availability		Leviathan and other recent gas discoveries + Gas delivery infrastructure being built
Sizable market for reliable power		Many data centers, manufacturing, hospitals, defense, hi-tech, and other typical Bloom customers
Energy policies		Unclear what kind of policy support would exist for technologies like Bloom
IP Protection		Strong protections exist

Back up

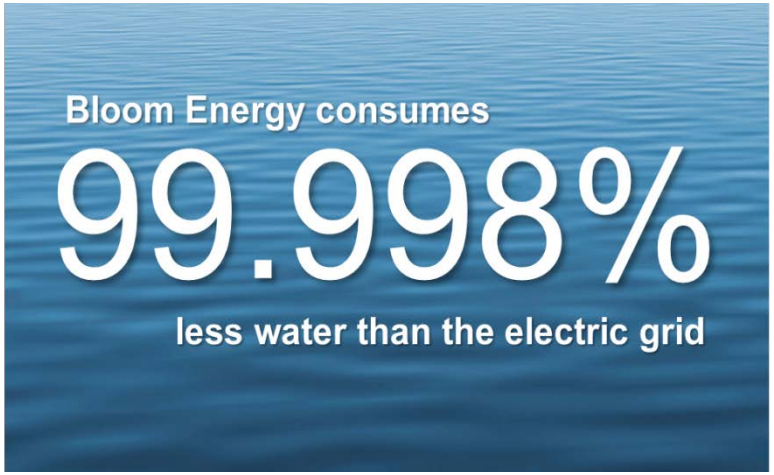
Sustainability Impact

CO_2 Emissions Compared (lbs/MWh)



For 1 Megawatt of Power

- Bloom Energy uses 120 gallons
- Grid uses 7,270,800 gallons, equivalent to 11 Olympic swimming pools every year



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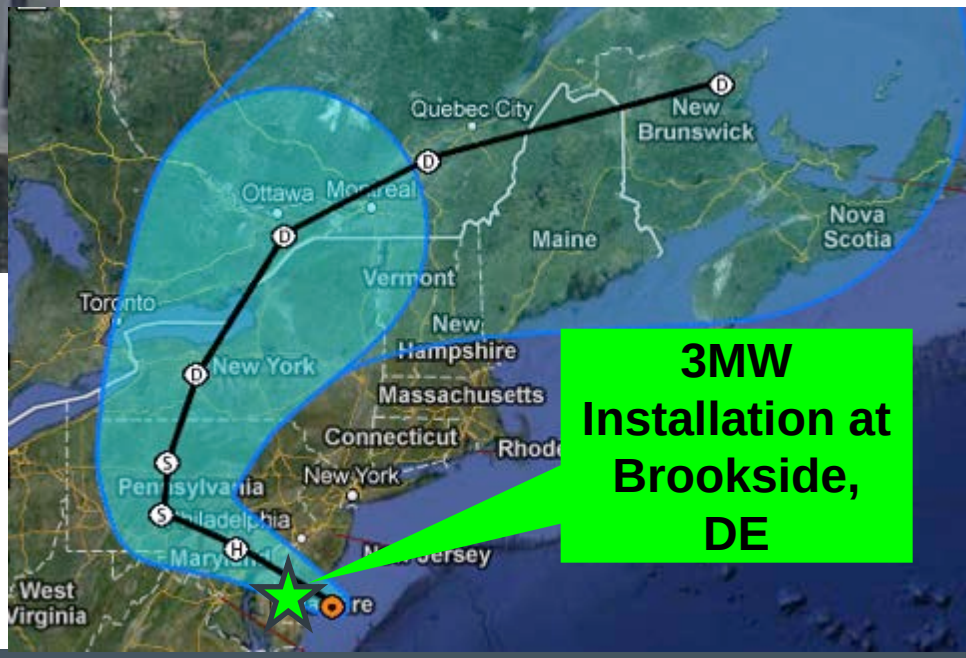
Bloom Works Reliably for Delmarva – 3 MW Installation

"Bloom Energy electrical project in New Castle was unaffected by Hurricane Sandy."

- Delmarva Regional President

- **Hurricane passed directly over installation**
- **Gas supply and power generation uninterrupted**



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Life Technologies - 1 MW Installation

- Millions of dollars of biotech inventory that must be refrigerated 24x7
- During utility grid outage, diesel generators could not get fuel, as supplies were rationed to hospitals
- Could not control the rising cost of grid power

- 24x7 onsite power, grid as backup
- Avoids needs for diesel generators; no transfer switch complexity risk
- Cost savings and carbon dioxide footprint reduction